

REMARKS

Reconsideration of the above-referenced application in view of the amendments and the following remarks is respectfully requested.

Claims 1-25 were pending in this case. Non-elected Claims 18-25 have been cancelled without prejudice. Claims 7-9, 13, and 15-16 have been cancelled without prejudice. New Claims 26-32 have been added. Claims 1, 10, 14, and 17 have been amended to better define the features of the claimed invention. The Title has been amended to better conform with 37 CFR 1.72(a).

Applicant affirms the election made to prosecute Claims 1-17 and acknowledges that Claims 18-25 have been withdrawn from further consideration by the examiner.

Claims 1 and 8 stand rejected under 35 U.S.C. 112, second paragraph. Claim 1 has been amended to put it in statutory form. Claim 8 has been cancelled.

Claims 1-13 stand rejected under 35 U.S.C. 102(b) as being anticipated by Wark, et al. (U.S. Patent No. 5,929,521). Claim 1, as amended, includes the feature of "at least one conductive member formed on each of said multiplicity of conductive pads and extending away from said working surface, said at least one conductive member comprising a wire bonder stud bump." Wark does not disclose or suggest a conductive member comprising a wire bonder stud bump. Therefore, Applicant respectfully submits that Claim 1 is patentable over Wark. Claims 2-6 and 10-12 depend from Claim 1 and are therefore patentable over Wark for at least the reasons presented above.

Claim 14 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Wark in combination with King, et al. (U.S. Patent No. 6,208,027). Claim 14, as amended, includes the feature “wherein one or more of said conductive members comprise wire bonder stud bumps bonded on top of another wire bonder stud bump.” Neither Wark nor King disclose or suggest the use of wire bonder stud bumps. Therefore, Applicant submits that Claim 14 is patentable over the combination of those references.

Claims 15, 16, and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Wark. Claims 15 and 16 have been cancelled. Claim 17, as amended, includes the feature of “at least three conductive lengths of wire extending away from said working surface bonded to a selected one of said multiplicity of conductive pads by a wire bonding machine to form an interconnecting nest.” The Examiner refers to the passage in Wark at col. 6, lines 31-33 and further refers to a teaching of a “length of wire” in Wark. Applicant respectfully disagrees. Nowhere does Wark suggest that his projections are related to wire bonding. In fact, in the list of methods Wark mentions for forming the projections at col. 4, lines 40-49, wirebonding does not appear although many other techniques are listed (e.g. subtractive, additive, stenciling, printing, stamping, electrochemical or electroless plating, adhesives, and bonding of preformed contact pads having projections thereon). For at least these reasons, Applicant respectfully submits that Claim 17 is patentable over Wark. Similarly, Claim 1, which incorporates features similar to those included in cancelled Claims 15 and 16, as well as new Claims 26-32 are patentable over Wark for at least the same reasons.

Applicant respectfully requests reconsideration and withdrawal of the rejections and allowance of Claims 1-6, 10-12, 14, 17 and 26-32. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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Version with Markings to Show Changes Made

In the Specification:

Please amend the Title as follows:

LOW COST AREA ARRAY PROBE [FOR CIRCUITS HAVING SOLDER-BALL
CONTACTS ARE MANUFACTURED USING A WIRE BONDING MACHINE]

In the Claims:

1. (amended) Apparatus for testing circuitry having an array of solder-ball contacts or connection probes of a selected size, said solder-ball contacts having a contact area and a peripheral area, comprising:
 - a support substrate having a working surface;
 - a multiplicity of conductive pads mounted on said working surface;
 - a multiplicity of conductive pathways extending from said multiplicity of conductive pads [paths] to test circuitry;
 - at least one conductive member formed on each of said multiplicity of conductive pads and extending away from said working surface, said at least one conductive member comprising a wire bonder stud bump; and
 - said conductive members formed on said conductive pads positioned on said support substrate to make an electrical connection with said peripheral area of said solder-ball contacts or connection points of a circuit placed against said apparatus.
7. (cancelled)
8. (cancelled)
9. (cancelled)

10. (amended) The apparatus of Claim 1 wherein said support substrate comprises a planar insulating material and said conductive pathways comprise conductive traces formed on said planar [planer] insulating material.

13. (cancelled)

14. (amended) The apparatus of Claim 1 [13] wherein one or more of said conductive members comprise wire bonder stud bumps bonded on top of another wire bonder stud bump.

15. (cancelled)

16. (cancelled)

17. (amended) Apparatus for testing circuitry having an array of solder-ball contacts of a selected size with a contact area and peripheral area, comprising:
a planar insulating support substrate having a working surface and a back surface;

a multiplicity of conductive pads formed [paths forms] on said working surface;

conductive pathways formed on said working surface leading from said multiplicity of conductive pads to testing circuitry;

at least three conductive lengths of wire extending away from said working surface bonded to a selected one [ones] of said multiplicity of conductive pads by a wire bonding machine to form an interconnecting nest; and

said interconnecting nest positioned on said support substrate to receive a solder-ball contact point and making an electrical connection with said peripheral area of said received solder-ball for testing said circuitry.

18. (cancelled)

19. (cancelled)

20. (cancelled)

21. (cancelled)

22. (cancelled)

23. (cancelled)

24. (cancelled)

25. (cancelled)

Please add the following new claims.

26. (new) Apparatus for testing circuitry having an array of solder-ball contacts or connection probes of a selected size, said solder-ball contacts having a contact area and a peripheral area, comprising:

 a support substrate having a working surface;

 a multiplicity of conductive pads mounted on said working surface;

 a multiplicity of conductive pathways extending from said multiplicity of conductive pads to test circuitry;

 at least one conductive member formed on each of said multiplicity of conductive pads and extending away from said working surface, said at least one conductive member comprising a wire having first and second ends bonded to said conductive pad; and

 said conductive members formed on said conductive pads positioned on said support substrate to make an electrical connection with said peripheral area of said solder-ball contacts or connection points of a circuit placed against said apparatus.

27. (new) The apparatus of Claim 26, wherein a point on said wire between said first and second ends is raised off of said conductive pad.

28. (new) The apparatus of Claim 27, wherein said raised point of said wire is supported by mold compound.

29. (new) An apparatus for testing an integrated circuit having solder ball interconnects, comprising:

- a substrate;
- a plurality of pads on said substrate;
- a plurality of wire bonder stud bumps on at least one of said plurality of pads, whereby said stud bumps form a nest for contacting one of said solder ball interconnects.

30. (new) The apparatus of Claim 29, further comprising a wire extending from said stub bump away from said substrate.

31. (new) The apparatus of Claim 29, wherein said stud bump and said wire are gold.

32. (new) The apparatus of Claim 29, wherein said stud bump and said wire are aluminum.